

an - Transformers, Power
Single-Phase, Step-Down for Distribution Substation Use

Manufacturer	Primary Voltage - kV	Nominal OA Capacity (kVA)	
		167 - 833	1250 - 10,000
<u>ABB</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
<u>Central Moloney</u>	34.4	X	
<u>Cooper Power Systems*</u>	34.4	X	X
	43.8	X	X
<p>* Also available with optional Envirotemp FR3 fluid. Although Envirotemp FR3 fluid is a vegetable oil-based product, end-users are still subject to the federal oil pollution regulations under 40 CFR 112. End-Users should contact their appropriate local, state, or federal regulatory authority regarding the management, spills, and spent Envirotemp FR3 fluid.</p>			
<u>Kuhlman</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
<u>Pennsylvania Transformer Technology, Inc.</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
<u>Waukesha Electric Systems</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and, 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an-3.1
June 17, 2004

an - Transformers, Power
Three-Phase, Step-Down for Distribution Substation Use

Manufacturer	Primary Voltage - kV	Nominal OA Capacity	
		750 to 3750 kVA	5 to 30 MVA
<u>ABB</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB Types UTS-A, UTT-B and UVW load tap changers.

<u>Cooper Power Systems*</u>	34.4	X	X
	43.8	X	X

* Also available with optional Envirotemp FR3 fluid. Although Envirotemp FR3 fluid is a vegetable oil-based product, end-users are still subject to the federal oil pollution regulations under 40 CFR 112. End-Users should contact their appropriate local, state, or federal regulatory authority regarding the management, spills, and spent Envirotemp FR3 fluid.

Transformers 5 MVA and larger also accepted as load tap changing transformers using Cooper Types 550, 550B and 550C load tap changers.

<u>Kuhlman</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Siemens-Allis Types TLS and TLH load tap changers

Manufacturer	Primary Voltage - kV	Nominal OA Capacity	
		750 to 3750 kVA	5 to 30 MVA
<u>Pennsylvania Transformer Technology, Inc.</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Cooper Types 550, 550B and 550C load tap changers.

<u>Waukesha Electric Systems</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115	X	X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB Type UZE; Reinhausen RMT-1; Reinhausen RMV-2; or Waukesha Electric Systems Type UZD load tap changers.

Notes:

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and, 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

U he - Enclosures, Sectionalizing Equipment
(200 and 600 amp)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	Type VFI*, single-phase and three phase, padmounted fault interrupters, 15-35 kV Type R-VAC*, three-phase vacuum switchgear, 15-25 kV
*Cooper Envirotemp FR3 dielectric fluid is available as an option	
<u>Electrical Equipment</u>	Type PSI-PSI/II Series, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching. (When ordering, add suffix B-4) Type PSE Series, 15 kV, 25 kV, 600 amp switch, 200 amp fuse Type PGE Series, 15 kV, 25 kV, SF6 interrupter, 3-phase, 600 amp switch, 200 amp fuse
<u>Elliott</u>	Type EPMR, Single and three-phase, pad-mounted, 25 kV
<u>ERMCO</u>	Type FusePad, single-phase, 200 amp, 15 kV
<u>G & W</u>	Type PVI series, single-phase and three-phase, 200 amp and 600 amp, 15 kV and 25 kV
<u>Hubbell (Chance)</u>	Type LVS (pad-mounted) single-phase and three-phase, vacuum switching equipment, fused or unfused, 200 or 600 amp, 15-25 kV Type AIS padmounted, air insulated switchgear, fused or unfused, 200 or 600 amp, 15 kV or 25 kV

Notes:

1. Enclosures on this page must comply with the deadfront requirements of RUS Spec. U-4.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
3. Single-pole switching of three-phase underground circuits may cause ferroresonance.

an-1.1
June 17, 2004

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

Applicable Specifications: "RUS Specifications for Rural Distribution Transformers," D-10

Listing is by type rather than by catalog number because of the many possible combinations of voltage, kVA and taps and protective equipment.

	7.2/12.5 & 7.62/13.2	14.4/24.9	Dual Voltage
<u>ABB</u>			
Conventional, single bushing	S-B3	S-B3	S-B3
Self-protected, single bushing	CSP-B3	CSP-B3	CSP-B3
Conventional, two bushing	S-A	S-A	S-A
Type S-B3 may also be obtained with internal fuse, with internal fuse and double gap, and with lightning arrester and open link cutout (Type PC).			
<u>Arkansas Electric Cooperative</u>			
Conventional, single bushing	ASE	-	-
<u>Central Moloney</u>			
Conventional, single bushing	AOD	AOD	AOD
Conventional, two bushing	AOD	AOD	AOD
Self-protected, single bushing	DVP	DVP	DVP
The single bushing transformer may also be obtained with bushing mounted cutout and lightning arrester, and with internal fuse and double gap.			
<u>Cooper Power Systems¹</u>			
Conventional, single bushing*	REA-Conv	REA-Conv	REA-Conv
Self-protected, single bushing*	REA-CSP	REA-CSP	REA-CSP
Conventional, two bushing*	REA-Conv	REA-Conv	REA-Conv

Conventional single bushing type may also be purchased with external overload protection and double gap and with bushing mounted cutout and lightning arrester.

*Cooper Envirottemp FR3 dielectric fluid is available as an option

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

an - Transformers, Distribution, Pole Type

Manufacturer	Conditions
<u>ABB</u>	
7.2/12.5, 7.62/13.2 14.4/24.9 kV & Dual Voltage	
Single-phase, single bushing, 25 and 50 kVA pole type distribution transformers with amorphous metal cores.	To obtain experience.
Single-phase, single bushing and two-bushing with internal UMX Under-oil Arrester or with internal "Tranquell" Under-oil Arrester.	To obtain experience.
<u>Cooper Power Systems¹</u>	
7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage*	
Single-phase, single bushing, self-protected, with Magnex Interrupter	To obtain experience.
Above or Conventional, single or two bushing; Type REA Conv. or Self-protected, single bushing Type REA-CSP with Type AZU, MOV, heavy-duty under-oil arrester.	To obtain experience.
*Cooper Envirotemp FR3 dielectric fluid is available as an option	
<u>Ermco¹</u>	
7.2/12.5 and 7.62/13.2 and 14.4/24.9 kV	
Single-phase, single bushing with internal Tranquell Under-oil Arrester	To obtain experience.

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For underground application)

Manufacturer	Single-Phase 5 - 167 kVA	Three-Phase 30 - 2500 kVA
ABB	"Mini-Pak U-5"	Type MTR (75-1500 kVA) "Plazapad-U5" (2000-2500 kVA)
Central Moloney	"REA-LP"	-
Cooper Power Systems*	"REA Shrubline"	"REA Terra-Tran"
	*Cooper Envirotemp FR3 dielectric fluid is available as an option	
ERMCO	"Low-Profile"	-
General Electric	-	"Compad IV - REA"
H. K. Porter (Delta-Star)	"Low Profile U 5-R"	"Porter U5-R3"
Howard	"Hi Pad REA"	"Hi Pad 3 REA"
Kuhlman	"Lo-Pak ELR"	"K-PAK-3 REA"
Pauwels Tranformers	"Turf-Hugger-R"	"Turf-Hugger-R"
United (KAEC)	"Pad-Mount" 15-100 kVA (1) "Pad-Mount" 25 & 50 kVA (2)	-
VanTran	"Mini-Pad U5" (1)	"VanTran III-U5"

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

All single-phase and three-phase transformers above accepted for the following voltages (kV) unless otherwise noted: 12.47/7.2; 13.2/7.6; 24.9/14.4; and 24.9/14.4 x 12.47/7.2 dual voltage

(1) Accepted for 12.47/7.2 kV and 13.2/ 7.62 kV only.

(2) Accepted for 24.9/14.4 kV only.

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

Not all kVA sizes in above kVA ranges are available from all listed manufacturers.

Some of the above single-phase and three-phase transformers are available with internal under oil surge arresters. The availability and type of arresters vary with each manufacturer. The following types of under-oil arresters are acceptable: "UMX", "Tranquell" and "AZU."

U an-2
June 17, 2004

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For unit residential underground application)
(Single-phase, 7.2 kV and 7.6 kV)

Manufacturer	5 - 25 kVA Only
ABB	"Micro-Pak U-5"
Central Moloney	"REA-Mini-LP"
Cooper Power Systems*	"Ranch Runner"
*Cooper Envirotemp FR3 dielectric fluid is available as an option	
ERMCO	"REA-MicroTrim"
Howard	"Spacesaver Pad"

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For underground application)

Conditions for Acceptance: To Obtain Experience

<u>Manufacturer</u>	<u>Type</u>
<u>ABB</u>	"Mini-Pak U-5" - Single-phase with composite fiberglass enclosure "Mini Three Phase" (MTP) 30 - 225 kVA
<u>Cam Tran</u>	"Cam Tran" - Three-phase, 12.47/7.2 and 13.2/7.6 kV; 30-2500 kVA
<u>Carte</u>	Three-phase, 24.9/14.4 kV, 30 - 2,500 kVA
<u>Cooper Power Systems*</u>	Single-phase, self-protected with "Magnex" interrupter Single-phase, self-protected with "AZU" MOV heavy-duty, under-oil arrester *Cooper Envirotemp FR3 dielectric fluid is available as an option
<u>ERMCO</u>	"E-PAD" Three-phase, 12.47/7.2 kV; 30-2,500 kVA "E-PAD" Three-phase, 24.9/14.4 kV; 30-2,500 kVA
<u>General Electric</u>	"Compad -IV-REA" - Three-phase, 75-750 kVA All above with amorphous metal cores
<u>GE-Prolec</u>	Mini Padmount, Single-phase, 10-167 kVA
<u>Square D</u>	Class 7230 REA - Three-phase, 75-2500 kVA 12.47/7.2 kV and 13.2/7.62 kV
<u>Van Tran</u>	"Mini-Pad U5" - 5-167 kVA, 24.9/14.4 kV

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

All single-phase and three-phase transformers above conditionally accepted for the following voltages (kV) unless otherwise noted: 12.47/7.2; 13.2/7.6; 24.9/14.4; and 24.9/14.4 x 12.47/7.2 dual voltage

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

Not all kVA sizes are available from all listed manufacturers.

U ja-2
June 17, 2004

U ja - Equipment Box Pad (Sleeve)*	
Manufacturer	Catalog Number
<u>Acura Fiberglass Corp.</u>	Model AG 4532
<u>Associated Plastics</u>	Transformer pad and box assembly, API 4242 RPM Pad and 1730 Box Transformer Pads, API 16 and API 45
<u>Blue Grass Vault Company</u>	BG-PV-T, BG-PV-1, BG-PV-2
<u>Concast</u>	Fibercrete modular bases
<u>Custom Composites</u>	R Series Fiberglass
<u>D & L</u>	Fiberglass
<u>Electri-Glass, Inc.</u>	BP-2000
<u>Electrimold</u>	EFBT,EFBS,EFBG Series
<u>Fiberglas Fabricators</u>	Transformer pad and sleeve assembly, FFBP series
<u>Formex</u>	Transformer pad and box assembly - TP-REA Series Pad, 1730-A Series Box
<u>Highline</u>	Box pad HL-45A, Size: L-43", W-34-1/2", D-32" Model AG 4532
<u>Malton</u>	FGS Series Fiberglass ground sleeves and box pads
<u>Maysteel</u>	CW-GS-P Series
<u>Mor-Tech Fab</u>	Transformer pad ground sleeves
<u>Nordic</u>	GS Series Fiberglass (excluding GS-37-43-15-A) CBP-37-43-15-A
<u>PenCell</u>	Transformer pad and box assembly- TPS-20-PE Pad, PE-20GS Box
<u>ProGlass, Inc.</u>	TX, SR, S, and SG Series (All without optional lids)
<u>Quality Fiberglass</u>	QF Series
<u>Synertech Moulded Products</u>	S1212, S1118, S1324, S1730, S2436, S3048 and S3660
<u>Thermodynamics</u>	Poly Pad - VC series (VCC-P series covers available) Polyethylene

*Order by catalog number and size.

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: RUS Specification U-2

Conductor: Copper, #4 AWG and larger; Aluminum, #2 AWG and larger

Insulation: Cross-Linked polyethylene (XLPE)

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Aluminum
Conductorres Monterrey, S.A. de C.V.	Copper or Aluminum
Condumex	Copper or Aluminum
Essex	Copper
General Cable	Copper or Aluminum
Nexans Canada	Aluminum
Okonite	Copper or Aluminum
Pirelli	Copper or Aluminum
Rome Cable	Copper or Aluminum
Service Wire Company	Copper
Southwire	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.